(cefotaxime and ceftriaxone). These strains are often resistant to gentamicin and/or fluoroquinolones so when treating multiresistant *E. coli* infection, the susceptibility test results are required to ensure that an appropriate effective drug is chosen.

Other multiresistant enteric bacteria

Klebsiella species are found in similar clinical settings to *E. coli* in community practice. They are naturally resistant to amoxycillin, and have a higher propensity to acquire resistances than *E. coli*. Almost 10% of strains are multiresistant (more than three acquired resistances).[4] Treatment options are similar to *E. coli*, again taking careful heed of the susceptibility test results.

Less commonly encountered multiresistant enteric bacteria are *Enterobacter* species, which are naturally resistant to amoxycillin, amoxycillin-clavulanate and cefazolin/cephalexin. Furthermore, these species can become resistant to third-generation cephalosporins during treatment. Treatment choices are restricted to trimethoprim/sulfamethoxazole or fluoroquinolones if susceptible on testing, or carbapenems for serious infection.

Multiresistant *Pseudomonas aeruginosa*

P. aeruginosa is naturally resistant to many antibacterial drugs. Without acquired resistance, this species is only susceptible to a limited range of beta-lactams (ticarcillin, piperacillin, ceftazidime, cefepime and meropenem), aminoglycosides (gentamicin, tobramycin and amikacin) and fluoroquinolones (norfloxacin and ciprofloxacin). Furthermore, *P. aeruginosa* has a high propensity to mutate to or acquire resistance to any of these drugs. Hence, in certain clinical settings such as intensive care and in patients with cystic fibrosis, multiresistant strains of *P. aeruginosa* are common.

Multiresistant strains may be encountered in the community, most commonly in complicated urinary tract infection. Treatment of mild to moderate urinary infection caused by these strains will be defined by the results of susceptibility tests. If the isolate is susceptible to ciprofloxacin, this drug can be given orally to outpatients. Otherwise, all other drugs must be administered parenterally, and hospital management is usually required. Strains isolated from otitis externa will usually respond adequately to topical treatment.

Conclusion

Although there are limited treatment options for infections caused by multiresistant organisms, there are still drugs available in the community in many cases and hospitalisation for more complex parenteral therapy can be avoided. In general, treatment of colonisation with multiresistant organisms is not required.

References

1. Rajendran PM, Young D, Maurer T, Chambers H, Perdreau-Remington F, Ro P, et al. Randomized, double-blind, placebo-controlled trial of cephalexin for treatment of uncomplicated skin abscesses in a population at risk for community-acquired methicillin-resistant Staphylococcus aureus infection. Antimicrob Agents Chemother 2007;51:4044-8.
2. Roche PW, Krause V, Cook H, Barralet J, Coleman D, Sweeny A, et al; Enhanced Invasive Pneumococcal Disease Surveillance Working Group, et al; Pneumococcal Working Party of the Communicable Diseases Network Australia. Invasive pneumococcal disease in Australia, 2006. Commun Dis Intell 2008;32:18-30.
3. Therapeutic Guidelines: Antibiotic. Version 13. Melbourne: Therapeutic Guidelines Limited; 2006.
4. Australian Group on Antimicrobial Resistance. Gram-negative survey. 2004 Antimicrobial Susceptibility Report. www.antimicrobial-resistance.com (go to AMR surveillance, GNB Susceptibility Report) [cited 2010 May 11]

In the last two years, Professor Turnidge has sat on anti-infective advisory boards for Janssen-Cilag and Pfizer.

Dental notes

*Prepared by **Michael McCullough**, Chair, Therapeutics Committee, Australian Dental Association*

The increasing prevalence of multiresistant bacteria in community-associated infections is most likely caused by over-prescription of antibiotics. The majority of dental infections can be successfully treated with an accurate diagnosis and timely dental treatment without antibacterial medication. When antibacterial drugs are needed, the principle of using a drug with the narrowest spectrum has long been held and is clearly outlined in recent guidelines.[1] Studies have shown that 85% of oral bacteria are susceptible to penicillin V. This is only marginally higher – 91% – with amoxycillin.[2] Over 10% of Australian *Streptococcus pneumoniae* isolates have reduced susceptibility to penicillins, yet these isolates paradoxically remain susceptible to higher doses of oral amoxycillin. Potentially life-threatening *S. pneumoniae* infections in children can be effectively treated with high-dose amoxycillin and this is one of the clinical reasons why amoxycillin is not recommended as the first drug of choice for oral infections.[1] Dentists should be aware of changing drug-resistance patterns and use antibiotics judiciously.

References

1. Therapeutic Guidelines: Oral and Dental. Melbourne: Therapeutic Guidelines Limited; 2007.
2. Baumgartner JC, Xia T. Antibiotic susceptibility of bacteria associated with endodontic abscesses. J Endod 2003;29:44-7.